



*LCA near-Term Ecosystem Restoration Plan
Restoration Opportunities and Descriptions*

SUBPROVINCE 3

Restoration Opportunity	Description
<i>Increase sediment transport down the Wax Lake Outlet</i>	Increase sediment transport down Wax Lake Outlet by extending the outlet northward through Cypress Island to connect to the Atchafalaya Main Channel. Currently, the Wax Lake Outlet (WLO) flows pass over the relatively shallow Six Mile Lake before entering the outlet. This measure would connect the deep outlet directly to the deep Atchafalaya Main Channel thereby increasing more bed load sediments to be transported to the WLO delta. The LSU CELSS Western Bays Model projected increased delta growth.
<i>Relocate Atchafalaya River navigation channel to Shell Island Pass</i>	This measure consists of relocating the Atchafalaya navigation channel. The Navigation Channel route through the delta has been identified as the greatest impediment to the delta's growth. Rerouting the Channel and using a passive hydraulic structure at the point of departure in the Lower Atchafalaya River would use river sediment used more efficiently in the delta lobes.
<i>Implement the Penchant Basin management plan</i>	Reduce excessive water levels in the upper Penchant Subbasin by implementing the Penchant Basin Plan. The Penchant Basin Plan would increase the efficiency of Bayou Penchant to convey flows from the area wetlands as Atchafalaya River stages fall after spring floods. Increased outlet capacities would utilize the flows to increase the circulation and retention to wetlands in the more tidal zone below the large fresh floating marsh zone. Wetlands losses would be reduced in both zones (LSU CELSS model results).
<i>Multipurpose operation of the Houma Navigation Canal Lock</i>	Multi-purpose operation of the Houma Navigation Canal Lock and related Morganza to the Gulf Hurricane Protection Project features. Improve the distribution of Atchafalaya flows through the HNC to the west in Falgout Canal, to the marshes east and west of the HNC, to the marshes south of the Lake Boudreaux Basin, and to the Grand Bayou marshes east of Bayou Point Au Chien. Structures would be operated during periods of low freshwater flows to reduce intrusion of high salinity water into low salinity wetlands.



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<i>Freshwater introduction into southwest Terrebonne wetlands via Blue Hammock Bayou</i>	Increase Atchafalaya Flow to SW Terrebonne via Blue Hammock Bayou. The project would increase the distribution of Atchafalaya flows in Fourleague Bay to Lake Merchant wetlands by increasing the cross-section of Blue Hammock Bayou. Marsh would be created with material dredged. Grand Pass and Buckskin Bayou, the outlets of Lake Merchant, would be reduced in cross section to increase the retention of Atchafalaya nutrients, sediment, and freshwater.
<i>Small freshwater diversion at Bayou Lafourche</i>	A flow of 1000 cfs would be pumped into Bayou Lafourche. The target wetland benefit area is the area between Bayous Lafourche and Terrebonne, south of the GIWW. The flow would be continuous and would freshen the target area wetlands and would reduce loss rates.
<i>Conveyance of Atchafalaya River water to northern Terrebonne wetlands</i>	<p>Increase Atchafalaya River flows to Terrebonne Basin by a diversion in the Avoca Island Levee, repairing eroding banks of the GIWW, and enlarging constrictions in the GIWW below Gibson and in Houma. Ideally, half of Bayou Shaffer flow, or more, would be diverted (via an open unstructured cut through the levee) into Avoca Lake to maximize land building. The percent flow diverted would be reduced if high water level impacts in the Penchant marshes would be too great. A constriction structure in Bayou Shaffer would be installed downstream of the levee cut to force flow into Avoca Lake. Several new channels connecting the eastern portions of Avoca Lake with Bayou Chene would be constructed to facilitate the distribution of sediments (land-building) across a wider portion of the lake bottom. Introduced flows leaving Avoca Lake would be readily carried southward down Bayou Penchant, increasing its sediment load, compared to the existing conditions where water has to back-up to Bayou Penchant through the Avoca Island Cutoff Channel. In lieu of a diversion from Bayou Shaffer into Avoca Lake, an alternative might be to partial or fully breach the Avoca Island Extension Levee where Bayou Shaffer runs adjacent to the Avoca Island Cutoff Canal. This cut would also involve an open armored channel.</p> <p>In conjunction with the Bayou Shaffer diversion, sections of eroded dredged material banks along the</p>



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	<p>GIWW would be repaired to contain flows for more efficient delivery to areas of need further east and to halt boat wake-induced erosion of shoreline marshes.</p> <p>In conjunction with the above measures, and to better carry water eastward to brackish areas of need, the GIWW constrictions would be enlarged. In Bayou Chene, the channel is roughly 12,000 sq. feet. But between Bayou Black and Bay Wallace, the channel is reduced to 5,500 sq. feet. The most severe constriction is in Houma where cross-section is reduced to as little as 2,200 sq. feet at the Bayou Terrebonne junction. An initial concept is to construct and maintain an 8,000 sq. foot channel through Houma. This concept is very closely linked with project number 5a above and would be considered only if that project shows that the presently available freshwater can be fully utilized through measures to introduce it into needy marshes south of the GIWW. This project would involve dredging to enlarge channel cross-section and relocations of businesses and utilities, together with bridge modifications as needed. The Houma GIWW tunnel may limit the degree to which the channel can be enlarged at the tunnel location.</p>
<i>Stabilize northern shore of East Cote Blanche Bay at Marone Point</i>	<p>Protect North shore of East Cote Blanche Bay from Point Marone to Jackson Bayou. Approximately 23,600 feet of bay shoreline would be stabilized to protect the interior wetland water circulation patterns in the Cote Blanche Wetlands CWPPRA project. The project was designed to increase the retention time of the Atchafalaya flows moving from the GIWW to East Cote Blanche Bay. Shoreline erosion is thought to have increased with dredging of shell reefs between the bay and gulf.</p>



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<i>Rebuild historical Point Chevreuil reef toward Marsh Island</i>	<p>This measure provides for rebuilding historic Point Chevreuil Reef toward Marsh Island. Rehabilitate the Bayou Sale natural levee between Point Chervil and the gulf. The natural levee would be rebuilt in the form of a shallow sub aqueous platform, small islands, and/or reefs. The historic shell reefs were removed by shell dredging. The feature would be about 12 miles long and would deflect some of Atchafalaya flow and sediments from entering East Cote Blanche Bay resulting in slightly higher salinities in the bay. Overall, this feature would restore some semblance of historic hydrologic conditions in the Teche/Vermilion Basin.</p>
<i>Stabilize gulf shoreline at Point Au Fer Island</i>	<p>This measure provides for stabilizing the gulf shoreline of Point Au Fer Island. Stabilize 81,500 feet of the gulf shoreline of Point Au Fer I to prevent direct connections between the gulf and interior water bodies. The gulf shoreline erosion would be arrested along the island thereby reducing the direct losses from the erosion. Indirectly, preventing the interior water circulation avenues from being connected directly to the gulf rather than Atchafalaya Bay and Fourleague Bay would reduce island marsh loss. The fresh nutrient and sediment rich bay waters provide for wetland needs much better than the high salinity gulf waters.</p>



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<i>Maintain land bridge between Caillou Lake and Gulf of Mexico</i>	Maintain the land bridge between the gulf and Caillou Lake by shore protection in Grand Bayou DuLarge to minimize salinity intrusion. This project would involve 43,000 feet of rock armoring or marsh creation to plug/fill broken marsh areas on the west bank of lower Grand Bayou DuLarge, where a new channel is threatening to breach the bayou bank and allow the establishment of a new connection with Caillou Lake. Some gulf shore armoring would likely be needed to protect these features from erosion on the gulf shoreline. A more systemic and comprehensive solution would involve a much greater amount of gulf shoreline armoring, especially toward the west where shoreline retreat and loss of shoreline oyster reefs has allowed for increased water exchange between the gulf and the interior waterbodies (between Bay Junop and Caillou Lake). Some of the newly opened channels would be closed to restore historic cross-sections of exchange points. By reducing marine influences in these interior areas, these features might also allow increased riverine influences from Four League Bay to benefit area marshes.
<i>Barrier island restoration at the Terrebonne shoreline</i>	This measure provides for the restoration of the Timbalier and Derrieres barrier island chains (Alternative a). This would simulate the 1890 condition with fewer breaches than now. The islands would be widened to 600m and the dune crest elevation would be 2.7 m (NGVD).
<i>Old River Control Structure study</i>	This proposal would alter the ORCS operational plan with a goal of increasing the sediment load to be transported by the Atchafalaya River. An approximate 20 percent increase in delta growth was proposed as the feature objective but would be refined upon detailed evaluation of the measure. Detailed studies of this proposal would include determination of impacts (beneficial and adverse) to the interior of the Atchafalaya Basin, the degree to which flow and sediment distributions would be required, and the increased costs of maintaining the flood control, navigation, and environmental features along the Lower Mississippi, Red and Atchafalaya Rivers.



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<i>Backfill pipeline canals</i>	This measure provides for the backfill of pipeline canals S. of Catfish Lake. The Twin Pipeline canals in this area are crossed by numerous oilfield canals greatly altering natural water circulation patterns. The 63,300 feet of pipeline canals would be filled at strategic locations to restore primary water circulation through Grand Bayou Blue. The retention time of Atchafalaya and Bayou Lafourche (pumped) flows would be increased to benefit effected wetlands.
<i>Freshwater introduction south of Lake Decade</i>	Enhance Atchafalaya flows to Terrebonne by constructing three small conveyance channels along the south shore of Lake Decade to the Small Bayou LaPointe area. Construct 3 conveyance channels along the south shore of Lake Decade to deliver Atchafalaya flows to wetlands between the lake, Bayou Dularge, and Lake Merchant. Channel flows would be controlled by structures that could be actively operated. Lowering salinities and increasing nutrient inputs would reduce intermediate marsh losses.
<i>Maintain Timbalier landbridge</i>	This measure provides for maintaining the Timbalier land bridge in the upper salt marsh zone. A grid of numerous trenasses has artificially increased the hydrologic connection between interior marshes with Caillou Lake and adjoining waterbodies. This problem would be addressed by depositing hydraulically dredged material to close the trenasses and areas of broken marsh to create a continuous 2,000-foot-wide and 111,000-foot-long berm of "high marsh" extending from Bayou Terrebonne to Bayou Lafourche (leaving several Bayous open). This berm would allow the freshwater flowing down from the GIWW through Grand Bayou to have a greater influence on interior marshes through existing water exchange points along Grand Bayou north of the proposed land bridge.



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<i>Rebuild historic reefs from Point Au Fer toward Marsh Island</i>	Enhance Atchafalaya River influence in eastern Atchafalaya Bay, Pt Au Fer Island, and Four League Bay by rebuilding the historic barrier between Point Au Fer and Eugene Island. This 22,700-foot barrier would separate Atchafalaya Bay from the gulf and would follow the historic Point Au Fer reef alignment. The barrier could be a reef, a barrier island, an intertidal spit, or a segmented breakwater. The barrier would increase delta development by reducing the effects of gulf waves and the erosive effects of strong frontal passages. It would benefit Point au Fer Island wetlands and Fourleague Bay wetlands by increasing Atchafalaya River influence while reducing gulf influence.
<i>Rehabilitate northern shorelines of Terrebonne/Timbalier Bays</i>	This measure provides for the rehabilitation of the northern shorelines of Terrebonne/Timbalier Bays with a segmented breakwater from the Seabreeze area to the Little Lake area. Rebuild and maintain the historic shoreline integrity around Terrebonne and Timbalier Bays by constructing 338,000 feet of segmented barrier along the west side of Terrebonne Bay, across the historic shoreline alignment along the northern sides of both bays, and along the east of Timbalier Bay. This measure was simulated by a wave model in DNR-funded Barrier Shoreline Feasibility Study conducted by T. Baker Smith (1999). The model results showed substantial benefits in reducing wetlands loss along the shoreline.
<i>Stabilize banks of Southwest Pass</i>	Maintain Southwest Pass integrity by protecting bay and gulf Shorelines. Southwest Pass banks are eroding and may result in greater exchange between Vermilion Bay and the gulf. The pass banks would be stabilized with armor to maintain the existing pass dimensions. This would involve the construction of 9.33 miles of dike at a width of 200 feet.



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<i>Third Delta study</i>	Build land in upper Timbalier Subbasin with a Mississippi River diversion (Third Delta). The Third Delta conveyance channel would parallel the east side of the Bayou Lafourche natural levee and split into two distributary channels. One would distribute flow and sediment to the Little Lake area of the Pointe au Chien area of the Timbalier Subbasin. The conveyance channel would be sized to have land building capability similar to the Wax Lake Outlet. (120,000 cfs with sediment enrichment)
<i>Maintain landbridge between Bayous Dularge and Grand Caillou</i>	Construct a land bridge between Bayous DuLarge and Grand Caillou south of Falgout Canal and northeast of Caillou Lake. A grid of numerous trenasses has artificially increased the hydrologic connection between interior marshes with Caillou Lake and adjoining waterbodies. This problem would be addressed by depositing hydraulically dredged material to close the trenasses and areas of broken marsh to create a continuous 300-foot-wide and 21,000-foot-long berm of "high marsh" extending from Bayou Grand Caillou to Bayou DuLarge (leaving Bayou Sauveur open). This berm would separate the higher healthy brackish/saline marshes bordering the northeast end of Caillou Lake from the deteriorating inland intermediate/brackish marshes. It would also allow the freshwater flowing down the HNC and Bayou Grand Caillou to have a greater influence on interior marshes through existing water exchange points along Bayou Grand Caillou, north of the proposed land bridge.

Louisiana Coastal Area: Subprovince 3 Restoration Opportunities

Restoration opportunities:

- 1) Increase sediment transport down the Wax Lake Outlet
- 2) Relocate Atchafalaya River navigation channel to Shell Island Pass
- 3) Implement the Penchant Basin management plan
- 4) Multipurpose operation of the Houma Navigation Canal Lock
- 5) Freshwater introduction into southwest Terrebonne wetlands via Blue Hammock Bayou
- 6) Small freshwater diversion at Bayou Lafourche
- 7) Conveyance of Atchafalaya River water to northern Terrebonne wetlands
- 8) Stabilize northern shore of East Cote Blanche Bay at Marone Point
- 9) Rebuild historical Point Chevreuil reef toward Marsh Island
- 10) Stabilize gulf shoreline at Point Au Fer Island
- 11) Maintain land bridge between Caillou Lake and Gulf of Mexico
- 12) Barrier island restoration at the Terrebonne shoreline
- 13) Old River control structure study

Restoration opportunities continued:

- 14) Backfill pipeline canals
- 15) Freshwater introduction south of Lake Decade
- 16) Maintain Timbalier landbridge
- 17) Rebuild historic reefs from Point Au Fer toward Marsh Island
- 18) Rehabilitate northern shorelines of Terrebonne/Timbalier Bays
- 19) Stabilize banks of Southwest Pass
- 20) Third delta study
- 21) Maintain landbridge between Bayous Dularge and Grand Caillou

